Jan. 28, 1958 E. O. BUSHNELL 2,821,359

CHAIN TIGHTENER

Filed May 20, 1954 2 Sheets-Sheet 1

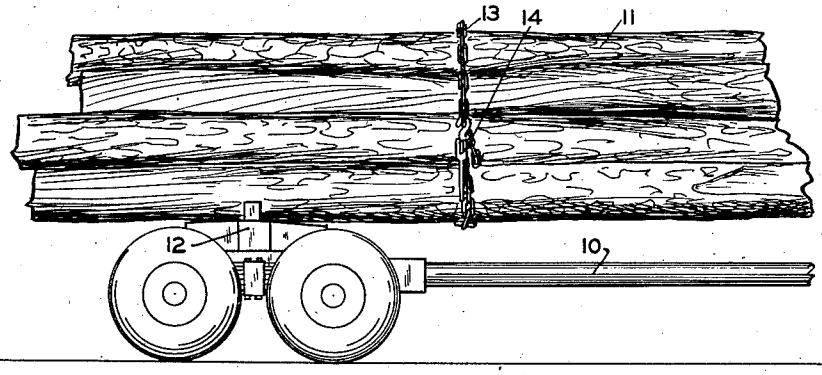


FIG. 1

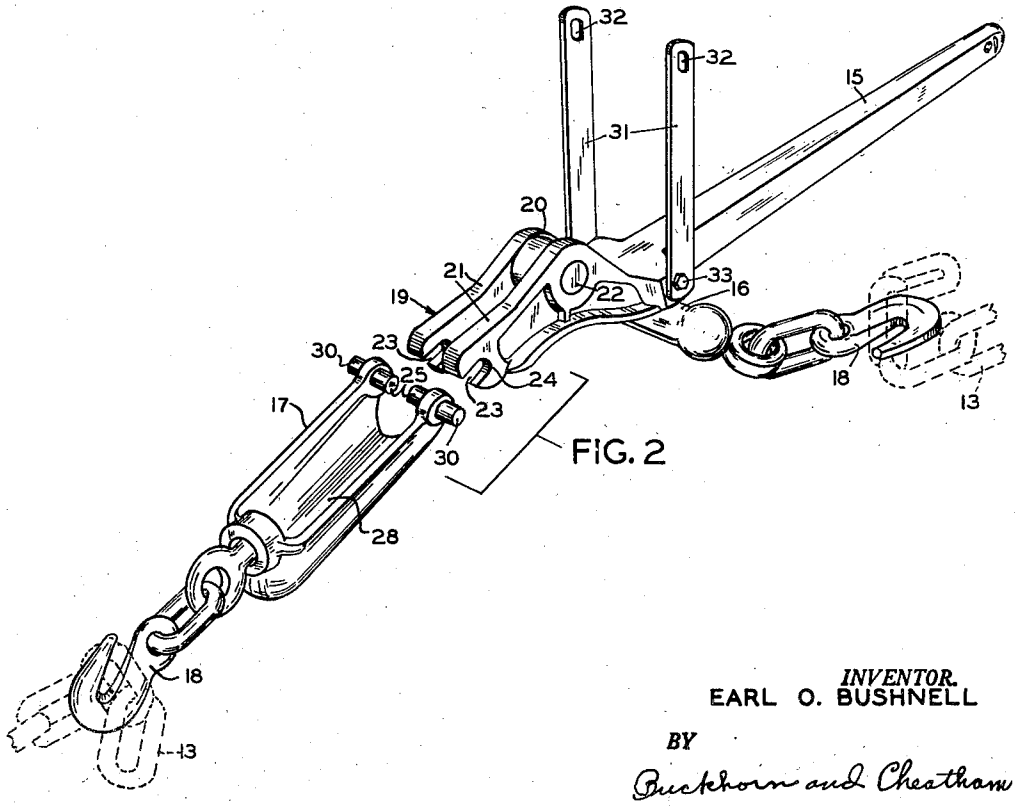


FIG. 2

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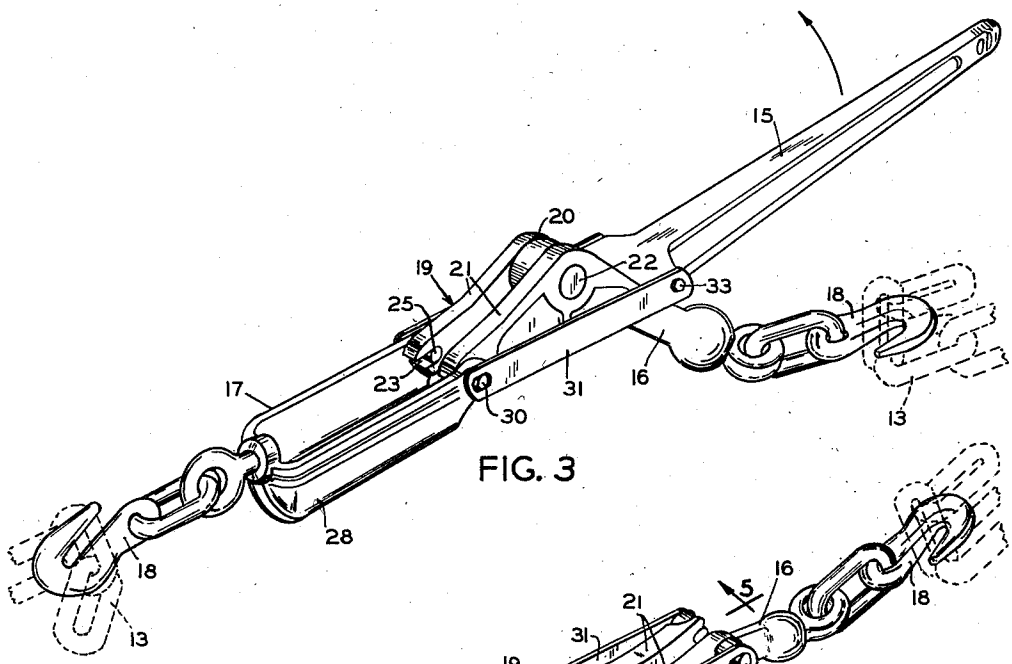


FIG. 3

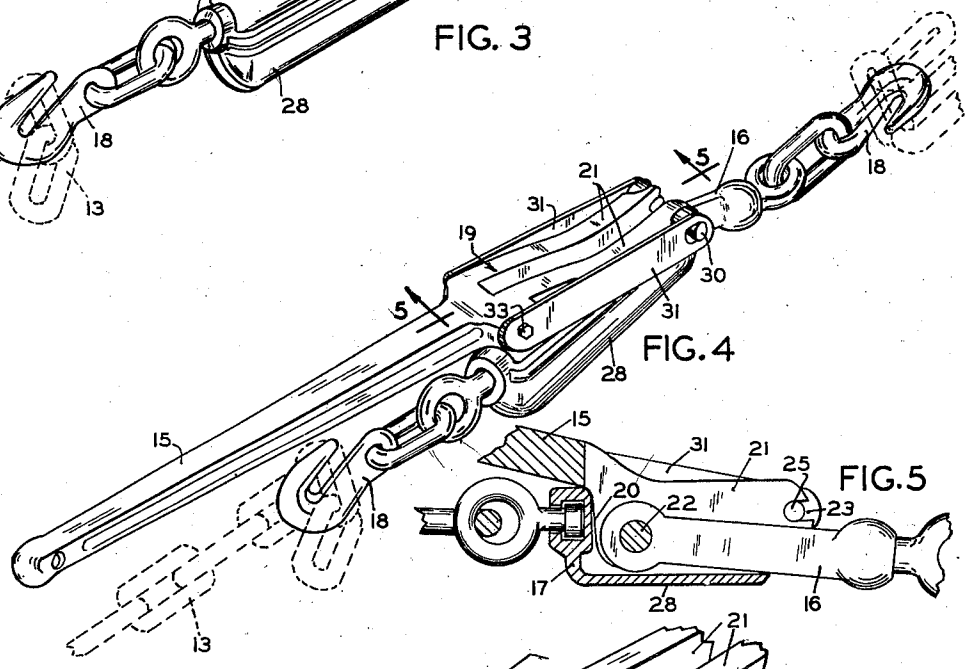


FIG. 4

FIG. 5

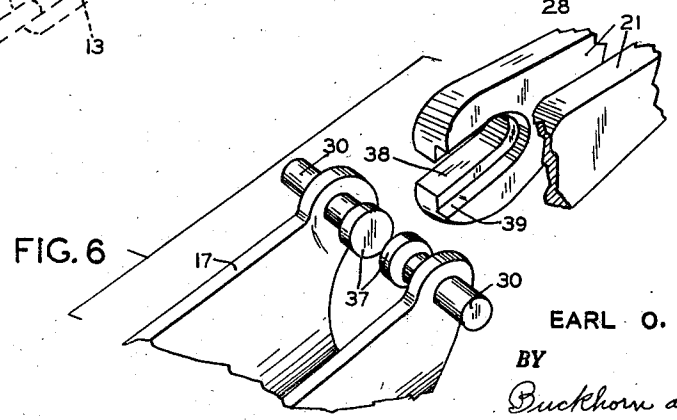


FIG. 6

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CHAIN TIGHTENER

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Application May 20, 1954, Serial No. 431,236

4 Claims. (Cl. 254—78)

The present invention relates to a tightening device adapted for use in tightening a chain or other flexible element about a load of logs or the like.

In hauling logs by motor truck from the forest to the sawmill, the logs are usually bound together by chains tightened around the logs by a suitable device generally known as a "log binder." Log binders, as conventionally used heretofore, comprise a pair of link members each having a grab hook to engage an end of the chain and a lever to which the link members are pivotally but permanently connected in such fashion that the lever may be thrown to an over center locking position to draw the link members together to tighten the chain. To release the binder the lever is thrown in the opposite direction and the chains manually removed from the grab hooks. Frequently, however, the logs on a load will shift so that the chain will still be drawn tight after the binder is open, making it impossible to disengage the chain from the grab hooks. In such a case the chain must be cut or the binder dismantled, either of which operations is dangerous because the logs may fall upon release of the chain. Many men have been killed and many more have suffered serious and crippling injuries from logs falling under such circumstances.

It is a principal object of the present invention, therefore, to provide an improved log binder whereby the same can be released from a load without endangering personnel.

More particularly, it is an object of the invention to provide a log binder which, upon opening, will cause complete release of the chains on the load.

Other objects and advantages of the invention will become more apparent hereinafter.

In accordance with the illustrated embodiment, the log binder of the invention includes a lever and a pair of link members as heretofore, but in the present instance the lever and one of the link members are so constructed as to be positively secured together in the locking position of the lever but are designed automatically to separate upon opening of the lever. The lever can be opened from a safe distance to free the chain from the load without the necessity of persons approaching the load until all danger has lapsed.

For a more complete description of the invention, reference is made to the accompanying drawings, wherein:

Fig. 1 is a fragmentary view showing how the binder of the invention is used to secure a chain about a load of logs on a log truck;

Fig. 2 is an exploded perspective view of the binder of the invention showing it in released or open position;

Fig. 3 is a perspective view of the log binder showing the same in open condition but with all parts secured together;

Fig. 4 is a further perspective view showing the log binder in the tightened condition;

Fig. 5 is a cross-sectional view taken substantially along line 5—5 of Fig. 4; and

Fig. 6 is a fragmentary exploded perspective view showing a modification of the invention.

With reference first to Fig. 1, there is shown therein the rear portion of a log truck 10 upon which a number of logs 11 are supported on the bolster 12 of the truck. In the present instance the logs are shown as bound together by a chain 13 tightened about the load by a binder indicated at 14.

With reference now to Figs. 2 to 5, inclusive, the log binder of the invention comprises a lever member 15 and a pair of link members including a swivel eye link 16 and a swivel clevis or yoke 17, each of which link members is provided with a grab hook 18 adapted for connection to the opposite ends of the chain 13. The lever member 15 includes an elongate handle portion and an obliquely disposed bifurcated end or foot portion 19 including a heel 20 (Fig. 5) abruptly offset from the handle, the foot extending generally back toward the center line of the handle. The swivel eye link 16 is pivotally secured between the forks 21 of the foot portion by a pivot pin 22 extending between the forks adjacent the heel. As will be seen, the swivel eye link swings between the forks 21 during the opening and closing movement of the lever 15.

Cooperative means are provided on the swivel yoke 17 and the toe of the lever foot portion for removably securing the yoke thereto. In the illustrated embodiment, the toe of each fork 21 is provided with a transverse slot 23 having spaced side walls extending substantially parallel to the longitudinal axis of the foot and a rounded inner end 24. The arms of the yoke 17 are spaced apart so that the yoke may straddle the foot portion and extending inwardly from the free end of each of the yoke arms is a gudgeon or trunnion pin 25 adapted to be received within the slots 23. As best seen in Fig. 2, the slots 23 are positioned slidably to receive or release the trunnion pins 25 when the binder is in the opened condition and wherein the lever 15 and yoke 17 extend from one another in substantial alignment.

With the binder as thus far described, it will be apparent that to engage the binder about a load, the yoke 17 and lever 15 would have to be held together manually during the intial closing movements of the lever. This may be difficult to do particularly where, as on a log truck, the binder is placed on the side of the truck and consequently an operator would have to support the weight of a considerable length of heavy chain. Thus, in accordance with the present invention, quickly releasable means are provided for temporarily securing the swivel yoke to the lever to facilitate attachment of the binder to the chain and tightening of the binder. Extending outwardly from each of the arms of the yoke 17 coaxially with the trunnions 25 are pintle pins 30. Catch means for engaging the pintle pins is provided on the lever, comprising in the illustrated embodiment of the invention, a pair of spring straps 31 hingedly mounted by suitable means such as stud bolts 33 threaded one into each of the opposite sides of the lever for swinging movement in planes perpendicular to the axis of the pintle pins. Each of the straps 31 is provided with an opening 32 adjacent its free end for receiving and engaging a pintle pin 30 when the trunnion pins 25 of the yoke are fully engaged within the slots 23 of the lever toe. Preferably the openings 32 are somewhat larger than the pintle pins to facilitate their engagement thereon. As illustrated most clearly in Fig. 3, the spring straps 31 will secure the lever 15 and swivel yoke 17 in operative engagement to facilitate attachment of the binder to the ends of the chain 13 and will secure the yoke to the lever during the initial closing movement of the lever. The pintle pins 30 may pivot freely within the openings 32 of the straps during closing movements of the lever, thus not interfering with the op-

eration of the binder. The straps **31** are not intended to support any part of the tension load on the binder when the same is tightened.

To tighten the chain about a load, yoke **17** and lever **15** are secured together by the straps **31** and the grab hooks **18** engaged in the opposite ends of a chain. The lever **15** is then swung in the direction of the arrow of Fig. 3 to swing the lever about the trunnion pins **25** thus drawing the opposite ends of the chain together. The lever **15** is swung approximately 180 degrees until the pivot pin **22** securing the swivel eye link **16** to the lever swings past over center position whereupon the lever handle engages the bight of the yoke **17**. The lever foot portion and the yoke are dimensioned so that in the closed position of the binder the heel **20** is closely adjacent the bight of the yoke as shown in Fig. 5 whereby the lever and yoke are secured against relative longitudinal movement with respect to one another. This, of course, prevents accidental disengagement of the trunnion pins **25** from the slots **23** should for some reason the load on the chain slacken at a time when the spring straps **31** have been removed from the pintle pins **30**.

When the binder is to be released, the spring straps **31** are sprung coaxially out of engagement with the pintle pins and are then swung to an inoperative position as shown in Fig. 2. Thereafter the binder may be opened from a safe position by pulling the lever open by means of a rope. As the binder opens, the trunnion pins will slide in the slots **23** causing the swivel yoke **17** and lever **15** to separate, thus completely releasing the chain **13**.

The swivel yoke **17** is provided with a hood **28** which serves a two-fold purpose. One purpose is to strengthen the yoke and to prevent the arms thereof from spreading apart thus accidentally to release the lever, and, secondly, the hood prevents an accidental jar or knock from striking the heel of the lever to knock the same from the over center position which, of course, would effect release of the binder.

A modification of the invention is shown in Fig. 6. In some cases it is found that even presence of the hood **28** is not sufficient to prevent the arms of the swivel yoke **17** from separating under severe strain, causing the binder to separate. Accordingly, in accordance with one modification of the invention, the yoke is provided with headed trunnion pins **37** and the lever toe portions provided with T-shaped slots **38** adapted cooperatively to receive the trunnion pins. The engagement of the pin head with the shoulders **39** of the slots positively prevents the separation of the yoke arms relative to the forks of the lever.

While the binder has been described in connection with its use for securing a load of logs together, it is obvious that it is equally well adapted for other uses such as, for example, securing a load of pipes together.

Having illustrated and described preferred embodiments of the invention, it should be apparent to those skilled in the art that the invention permits of modification in arrangement and detail. I claim as my invention all such modifications as come within the true spirit and scope of the appended claims.

I claim:

1. A tightening device comprising an elongate lever, a first link pivotally connected to said lever intermediate the ends of said lever, a second link adapted to be pivotally connected to an end of said lever, said lever end having a slot therein defined by spaced side walls extending substantially parallel to the longitudinal direction of said lever, gudgeon means on said second link adapted slidably to be inserted and removed from said slot respectively to engage and disengage said lever and second link means, pintle means on said second link coaxial with said gudgeon means, and catch means pivotally mounted on said lever at a point spaced from said slot, and having a first position in which the catch means releasably and pivotally engages said pintle means to retain said gudgeon

means within said slot to secure said lever and second link means together, said catch means being movable to a second position out of engagement with said pintle means whereby said gudgeon means may be removed from said slot to separate said lever and said second link means.

2. In a binder for tightening a flexible element about a load, comprising a lever including a handle and an obliquely disposed foot portion having a heel and a pair of forks extending therefrom, a link pivotally connected to the heel of said foot portion for swinging movement between the forks of said foot portion, said link having means for connection to one end of said flexible element, and a clevis straddling said foot portion and pivotally connected to the free end of each fork thereof and having means for connection to the opposite end of said flexible element, the improvement comprising a pair of trunnion pins extending inwardly one from each of the free ends of the arms of said clevis, said forks each having a slot in the free end thereof extending in the longitudinal direction of said foot portion and receiving said trunnion pins, the closed ends of said slots defining bearings for said trunnion pins during binder opening and closing movement of said lever, a pair of pintle pins extending outwardly one from each of said clevis arms coaxially with said trunnion pins, and a pair of spring straps hingedly mounted one on each of the opposite sides of said lever for swinging movement in planes perpendicular to the axis of said pins, said straps having pintle pin receiving openings therein receiving and engaging said pintle pins when said trunnion pins are in operative position in said slots, said spring straps being yieldable laterally of said lever to permit the same to be sprung coaxially of said pintle pins to disengage the same whereby said clevis may be detached from said lever in the open position of the binder by sliding said trunnion pins out of said slots.

3. A binder for tightening a flexible element about a load comprising a lever including a handle and an obliquely disposed bifurcated foot portion having a heel and a pair of forks extending therefrom, a link pivotally connected to the heel of said foot portion for swinging movement between the forks thereof, said link being adapted for connection to one end of said flexible element, a clevis straddling said foot portion and pivotally connected to the free ends of the forks thereof and adapted to be connected to the opposite end of said flexible element, a pair of trunnion pins extending inwardly one from each of the free ends of the arms of said clevis, said fork ends each having a slot therein extending in the longitudinal direction of said foot portion for receiving said trunnion pins and defining bearings therefor, a pair of pintle pins extending outwardly one from each of said clevis arms coaxially with said trunnion pins, and manually releasable means on said lever for pivotally engaging said pintle pins to secure said clevis in operative position, said manually releasable means comprising a pair of straps pivotally mounted one on each of the opposite sides of said lever at a point spaced from said slot thereof and each having an aperture engaging the corresponding pintle pin in a first position of the strap to secure the clevis and lever together, said straps being pivotal to a second position out of engagement with said pintle pins to permit separation of said clevis and lever.

4. An over center locking binder for tightening a flexible element about a load comprising a lever including a substantially straight handle portion and a foot portion including a heel abruptly offset from said handle, said foot extending from said heel back towards the longitudinal center line of said handle but obliquely thereto and termivating in a toe, said foot portion having a transverse slot in the toe thereof, the longitudinal axis of which slot is parallel with the longitudinal axis of said foot portion, a clevis link adapted to straddle said end portion link and having trunnion means on the free ends of the

arms thereof for pivotally engaging in said slot, said lever being adapted to pivot 180° about said trunnion means from an open position with said clevis link in approximate alignment with said foot portion to a closed position wherein said clevis arms overlie said foot portion, said trunnion means being spaced from the closed end of said clevis link by a distance substantially equal to the distance between said heel and the closed end of said slot whereby said clevis closed end engages said heel in the closed position of said lever to prevent removal of said trunnion means out of the open end of said slot.

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